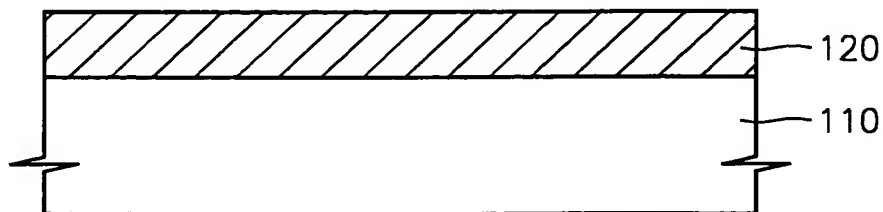
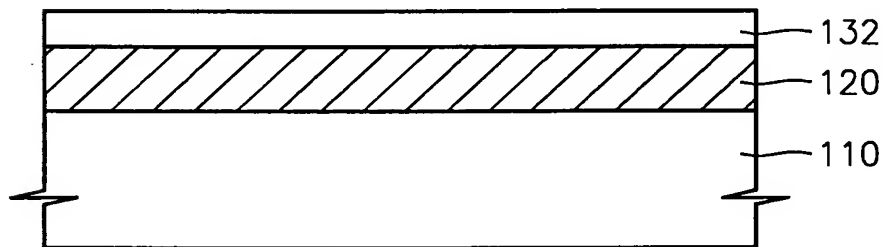


1/11

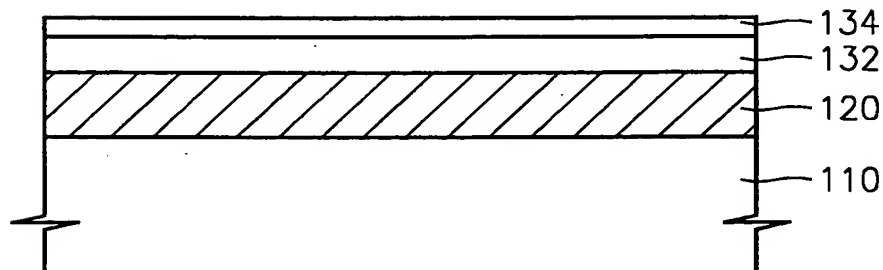
**FIG. 1A**



**FIG. 1B**

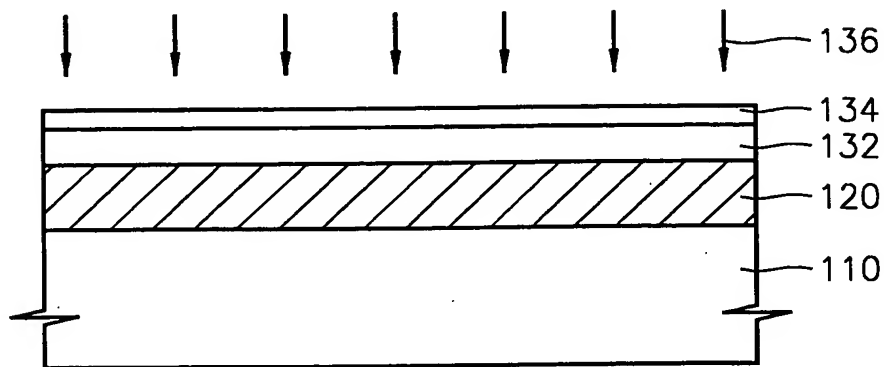


**FIG. 1C**

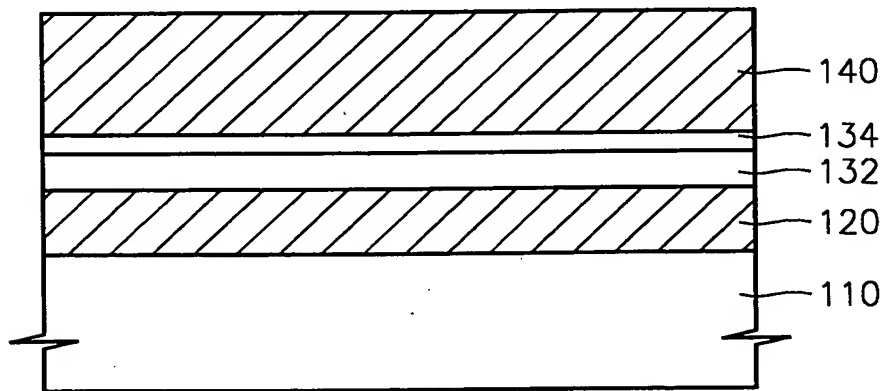


2/11

**FIG. 1D**

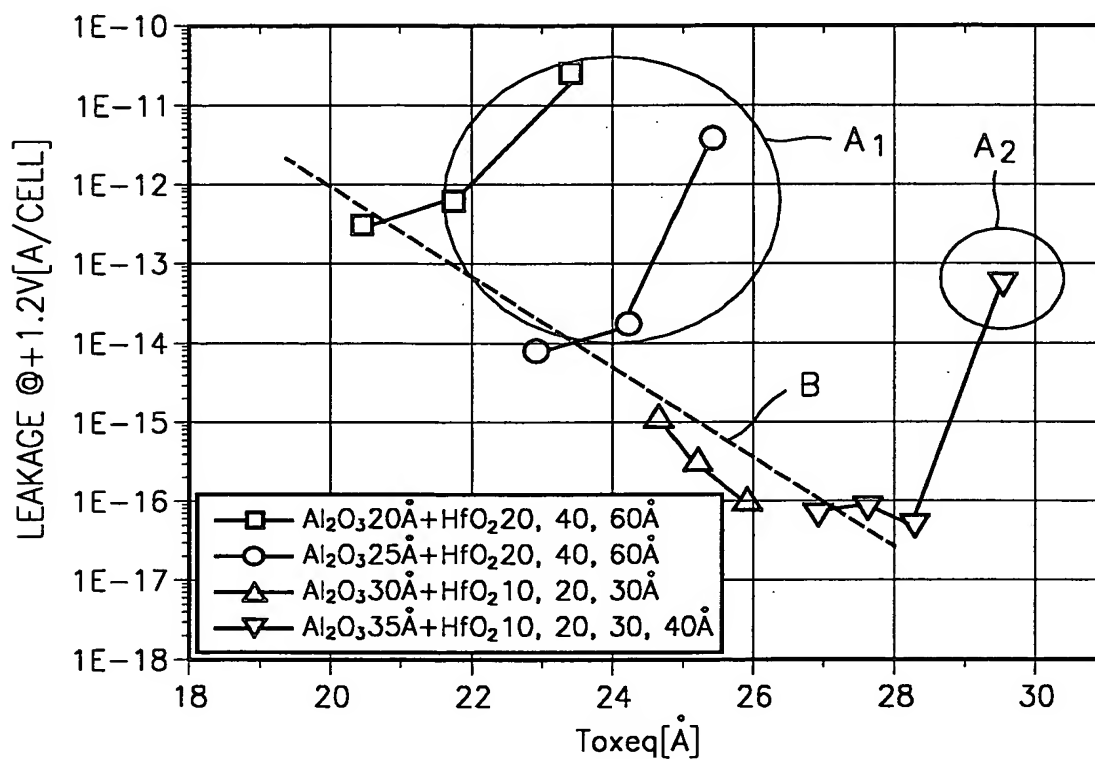


**FIG. 1E**



3/11

**FIG. 2**



4/11

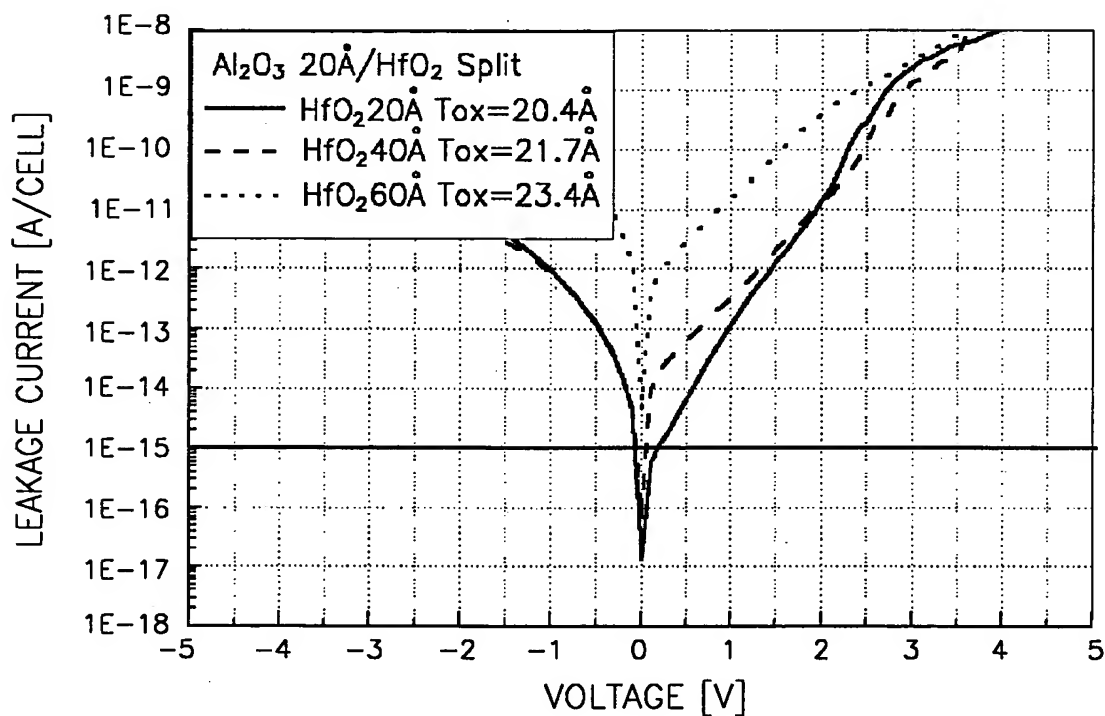
FIG. 3

$[\text{Toxeq}(\text{\AA})]$

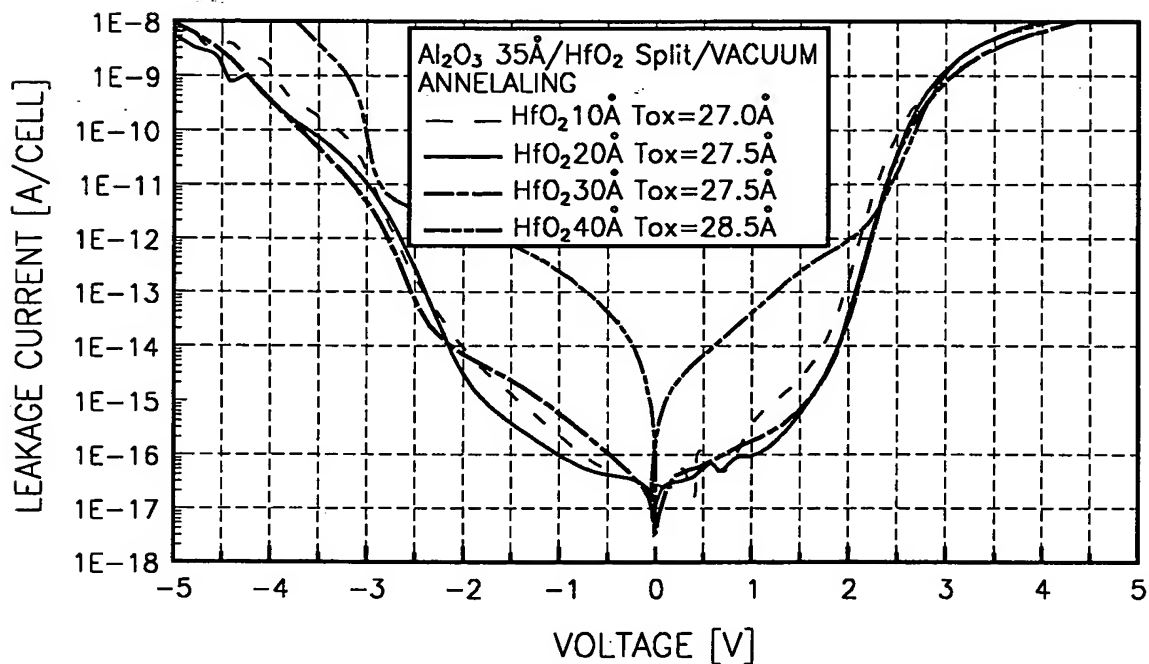
	10	20	30	40	50	60	$\text{HfO}_2$ THICKNESS( $\text{\AA}$ )
10	15.2	15.9	16.5	17.2	17.8	18.5	
15	17.5	18.2	18.8	19.5	20.1	20.8	
20	19.8	20.5	21.1	21.8	22.4	23.1	
25	22.1	22.8	23.4	24.1	24.7	25.4	
27.5	23.3	23.9	24.6	25.2	25.9	26.5	
30	24.4	25.1	25.7	26.4	27.0	27.7	
32.5	25.6	26.2	26.9	27.5	28.2	28.8	
35	26.7	27.4	28.0	28.5	29.3	30.0	
40	29.0	29.7	30.3	31.0	31.6	32.3	
$\text{Al}_2\text{O}_3$ THICKNESS( $\text{\AA}$ )		NORMAL LEAKAGE CURRENT				LEAKAGE CURRENT DETERIORATION	$\text{SiON} = 10\text{\AA}$

5/11

**FIG. 4**



**FIG. 5**



6/11

FIG. 6

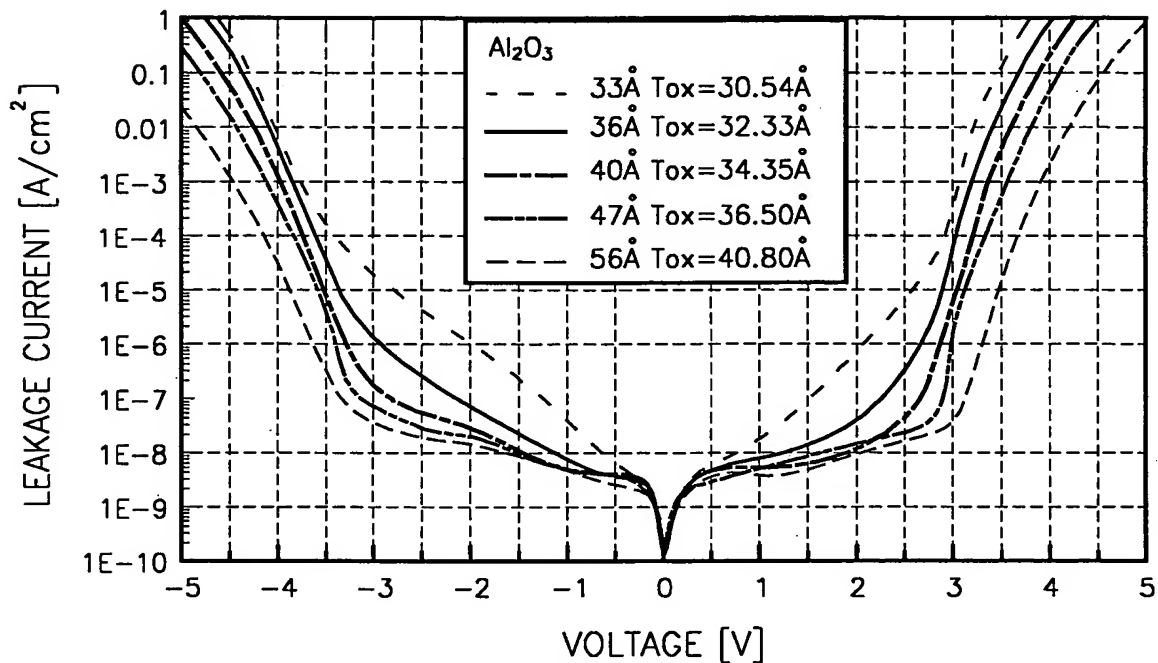
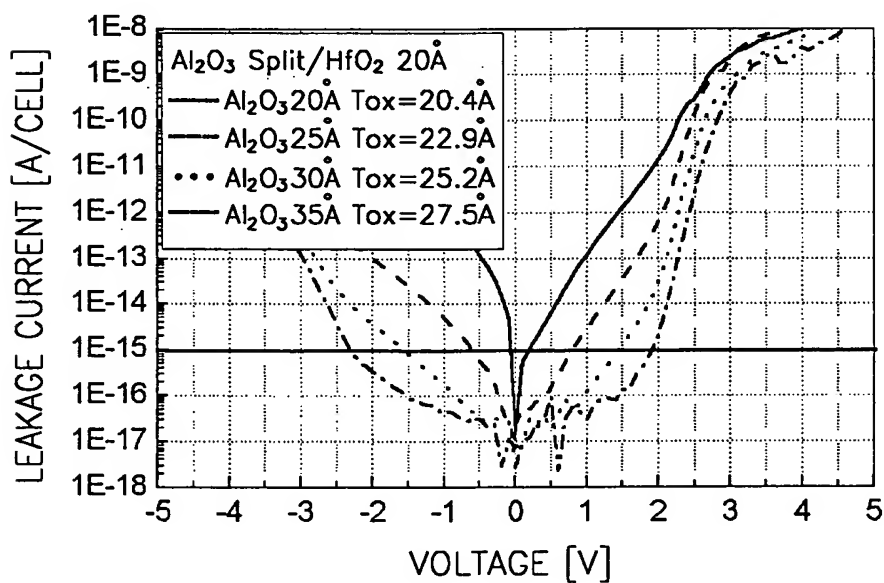


FIG. 7



7/11

**FIG. 8**

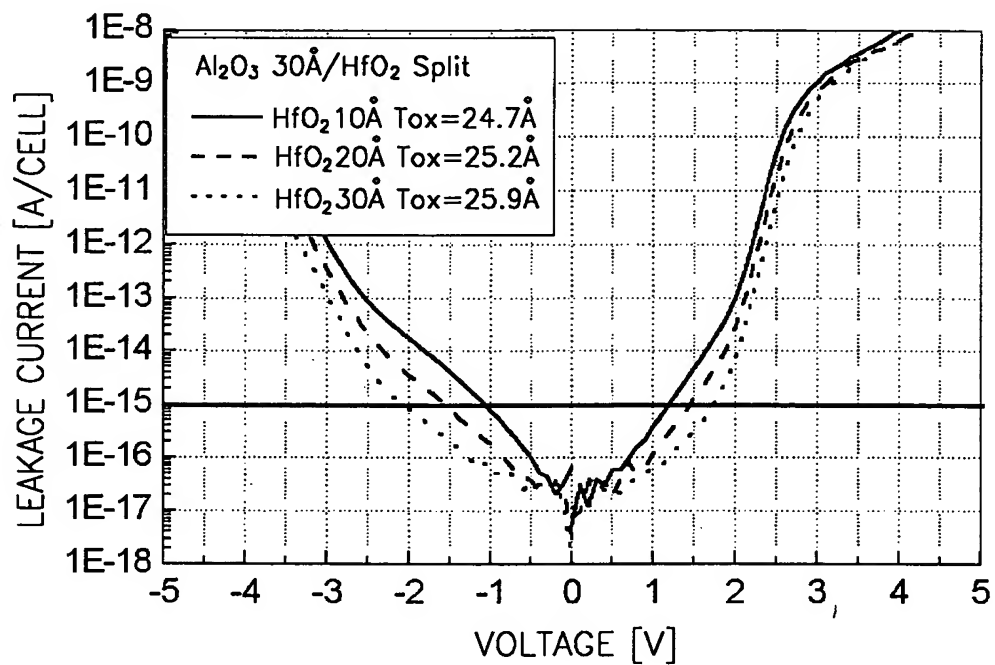
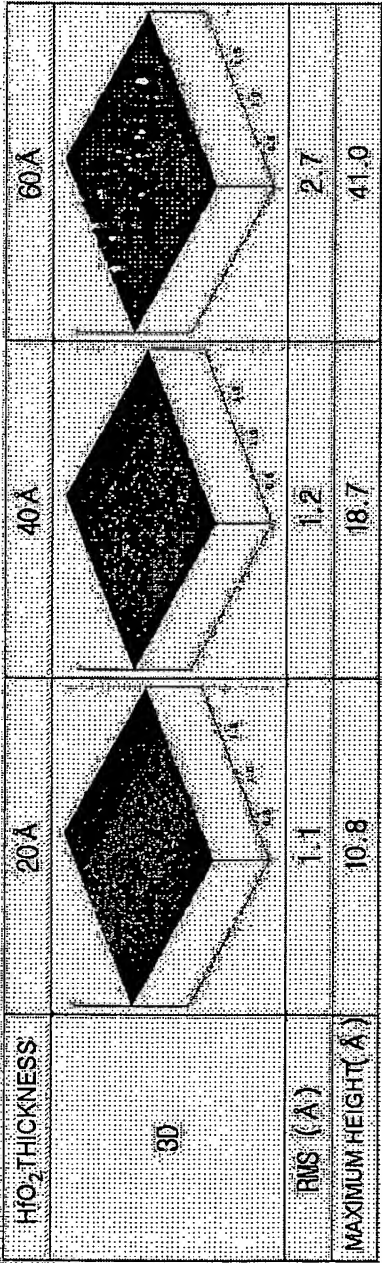


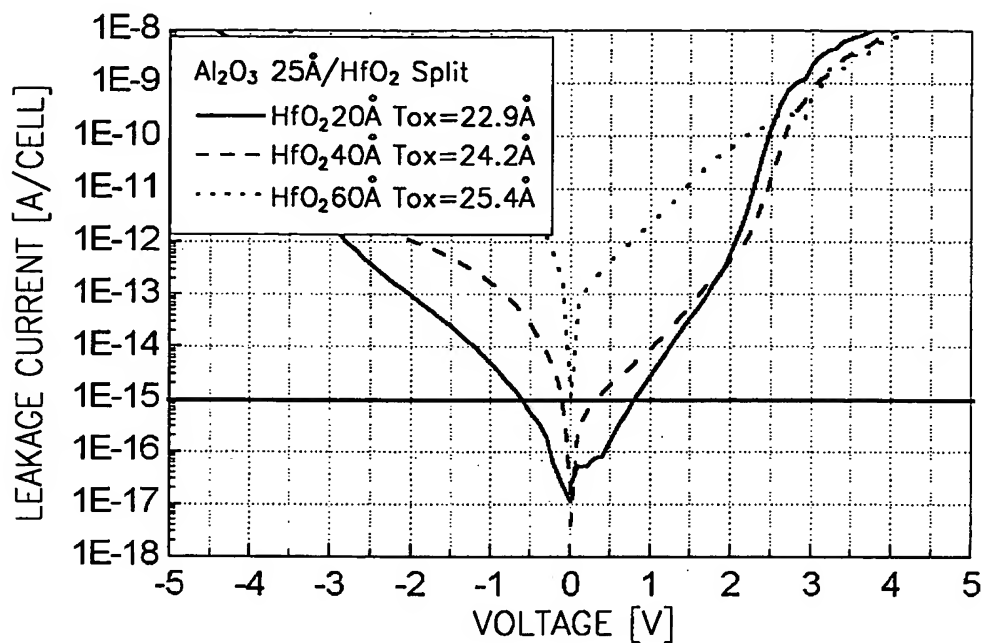
FIG. 9



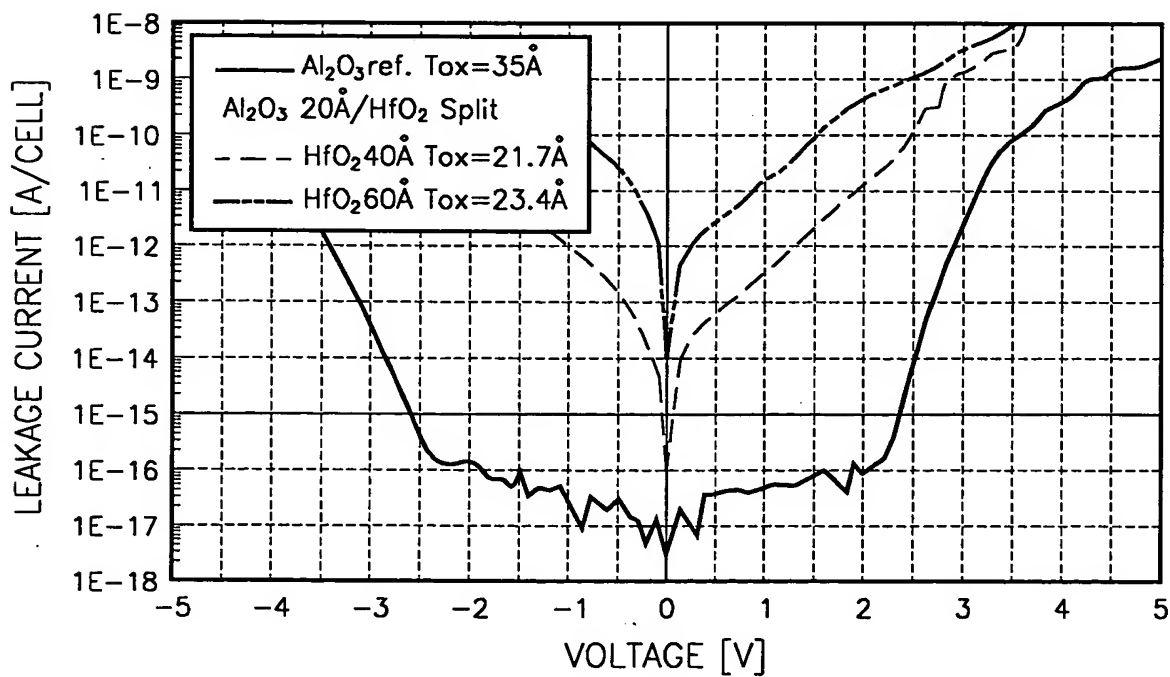


9/11

**FIG. 10**

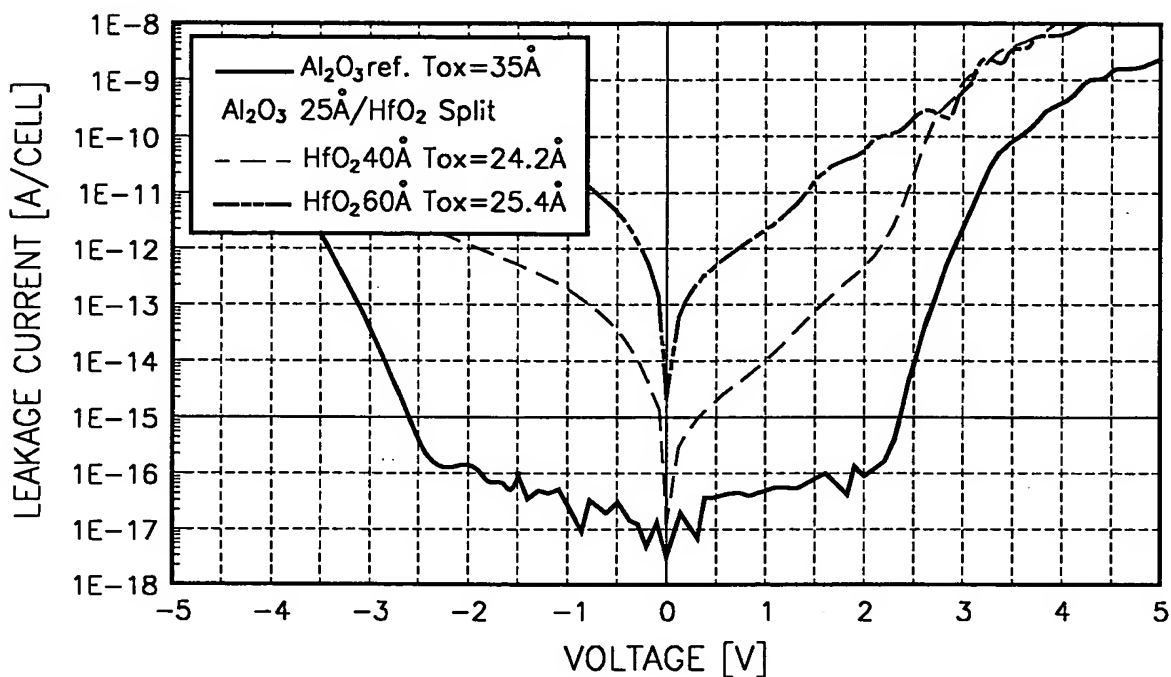


**FIG. 11**

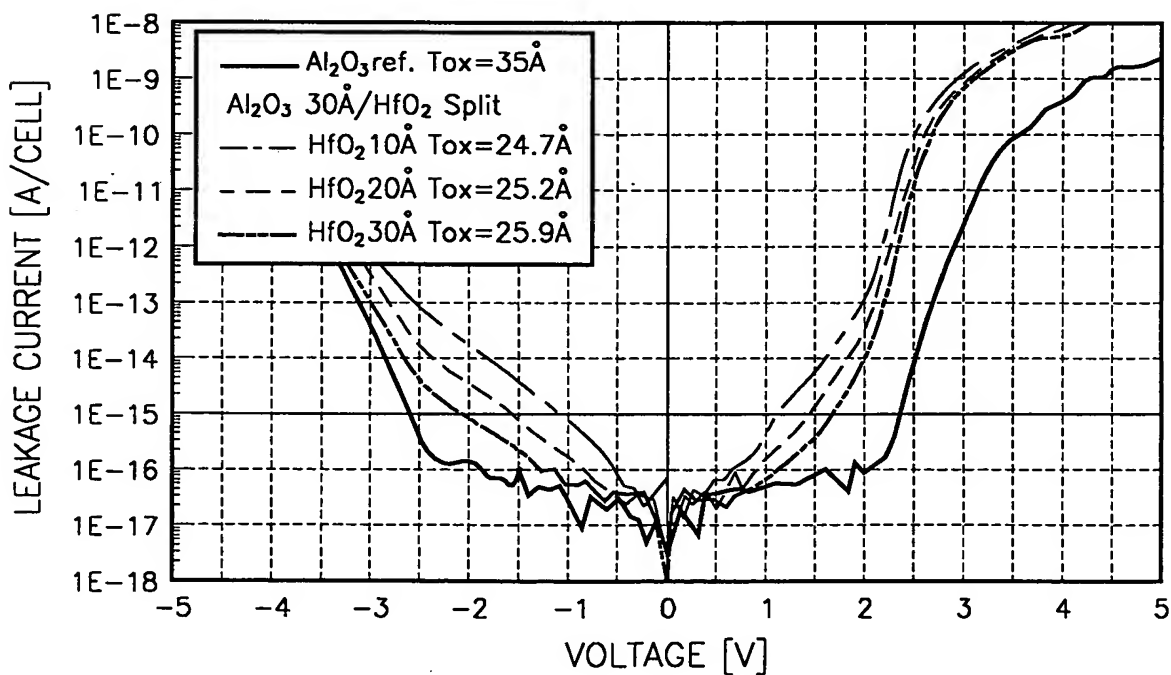


10/11

**FIG. 12**



**FIG. 13**



11/11

**FIG. 14**

